Fetal Alcohol Spectrum Disorder: Cause, Biology, and Approach to Management

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The #1 (preventable) cause of MR

Drink when you’re pregnant and the hangover can last
FOREVER

When a pregnant woman drinks alcohol she risks having a baby with brain damage and lifelong speech, learning, and behavior problems. If someone you care about is pregnant and drinking, show her you care.

TALK TO HER. SHOW HER YOU CARE.
Because drinking during pregnancy isn’t worth the risk.

For more information, call 1-877-9 BEST 4-2 or visit www.best4-2.com
Historical view of alcohol as a Teratogen

- Foolish, drunken, or harebrain women most often bring forth children like unto themselves
  Aristotle in *Problemata*

- Behold, thou shalt conceive and bear a son: And now, drink no wine or strong drink.
  Judges 13:7

Rosett, 1984
FASD Facts

- FAS 1-2/1000
- Spectrum (ARBD, ARND) 6X
- 50% of women who could become pregnant are drinking
- 2% of women drink significantly during pregnancy
- This is a preventable tragedy
Dosage of Alcohol

- Glass of wine, bottle of beer, shot of liquor are equal
- Approximately 0.5 oz absolute alcohol
- Fetal brain damage occurs at regular doses of 1-2 oz/day
Disorders of Fetal Alcohol Exposure

FAS ??exposure

Birth defects → ARBD

Prenatal EtOH exposure ← ARND

CNS findings/Behavior

Facial findings

Subnormal Growth

Partial FAS

FAS
Variability in FASD

- Dose of alcohol
- Pattern of exposure - binge vs chronic
- Developmental timing of exposure
- Genetic variation
- Maternal characteristics
- Synergistic reactions with other drugs
- Interaction with nutritional variables
Change in brain size

Cerebrum

Cerebellum

Corpus Callosum

Mattson et al., 1994
Corpus callosum abnormalities

Mattson, et al., 1994; Mattson & Riley, 1995; Riley et al., 1995
Brain damage resulting from prenatal alcohol
Neuropsychological Performance

Mattson, et al., 1998
General Intellectual Performance

Standard score

IQ scale

FSIQ  VIQ  PIQ

NC  PEA  FAS

Fetal Alcohol Syndrome

- Specific pattern of facial features
- Pre- and/or postnatal growth deficiency
- Evidence of central nervous system dysfunction

Photo courtesy of Teresa Kellerman
Facial features of FAS in the mouse

Adapted from Sulik & Johnston, 1982
Growing up with FAS

Courtesy of Ann Streissguth
Secondary Disabilities

Individuals with FAS/FAE have a range of secondary disabilities – disabilities that the individual is not born with, and which could be ameliorated with appropriate interventions.

[Graph showing percentages of individuals with various issues in different age groups]
Executive functioning deficits

Move only one piece at a time using one hand and never place a big piece on top of a little piece.

Starting position

Ending position

Rule Violations

Group

Mattson, et al., 1999

P<0.001
FAS – Only the tip of the iceberg

- Fetal alcohol syndrome
- Fetal alcohol effects
- Clinical suspect but appear normal
- Normal, but never reach their potential

Adaped from Streissguth
Prenatal Alcohol Exposure

- A continuum of fetal damage
- 1st trimester birth defects, 2nd Sab, 3rd reduced growth; continuous=all
- Brain damage throughout
- FAS DX: Altered growth, appearance, brain function
- FAE a partial expression (now FASD, includes ARBD)
- Face: short palpebral fissures, long, flat philtrum, thin upper lip, ear anomalies
- Other: heart, skeletal, unusual palmar creases
Alcohol Related Neurodevelopmental Disorder

- Infant: Problems with sleep, feeding, milestones, muscle tone, sensory information processing
- Child: Hyperactive, poorly coordinated, delayed, distractible, problems with learning, memory, attention, impulsive and uninhibited, social/obnoxious, school failure
- Adolescent/Adult: poor judgment, attention, problems with arithmetic, memory, abstraction, frustration/anger
- Secondary Disability: School dropout, drug abuse, teen parenting, unemployment, homelessness, legal and marital difficulty, short life span--huge societal cost
**Typical behaviors in FASD**

- hyperactive/poor attention span/easily overstimulated
- talkative/social/overly friendly/inappropriate touching
- impulsive/fearless/risk taking/poor judgment/unaware of consequences
- can’t generalize/need simple, single, repeated instructions
- appears functional/tries hard and fails/poor self esteem
Perception of the World in FASD

- concrete/unrealistic/poor insight
- don’t understand time, cause and effect
- safety/boundaries
- don’t understand responsibility, repercussions, social cues
- hypersensitivity/auditory/touch/visual
Overview of Approach to FASD Child/Student

- each FASD child unique; FASD overlaps many other conditions, especially ADHD, MR, autism
- long term goals: socialization, independence, prevent secondary disability
- see/perceive the world differently--organic brain damage with superimposed secondary problems, poor self-esteem—work on positives
- examine assumptions, observe child, include multisensory experiences
Brain dysfunction in FASD

1. Input:
   - Visual-reversals, figure/ground, spatial
     Try: bookstands, overlays, no copying, verbal input, touch
   - Auditory-signal/noise, discrimination
     Try: visual demos, picture story, reduce noise
   - Social-missing obvious cues
     Try: teaching cues/responses, how to play, practice
Brain dysfunction in FASD

2. Integration
- Sequencing, abstraction, conceptualization, generalization, organization, transitions
  - Try: recognize, assist, repeat, act out/practice, followup, warn

3. Memory
- short-term, long-term
  - Try: repetition, mnemonics, acting out, lists/notes
Brain dysfunction in FAS/E

4. Output

language (spontaneous, on demand, social); motor

Try: practice, role-play, different writing tools, dictation/typing, tracing
FASD “Solutions“

- assess individual situation; remember to treat younger-illusion of function
- structure, consistency, brevity, variety, persistence; multisensory experiences
- emphasize acting out normal as opposed to punishing abnormal
- “paradigm shift”, “shut down”
- 3 options: reminder/memory, add second sensory mode, encourage the response
- “find the hippity-hop”
Prevention – The Birth to 3 Program

- Parent-child assistance program
  - Intensive home visitation model for the highest risk mothers
  - Paraprofessional Advocates
  - Paired with client for 3 years following the birth of the target Baby
  - Link clients with community services
  - Extensively trained and closely supervised
  - Maximum caseload of 15

- Outcomes
  - Fewer alcohol/drug affected children
  - Reduced foster care placement
  - Reduced dependence on welfare

Grant, T.M., 1999; Ernst, C. C., et al. 1999
Summary

- Although FAS is entirely preventable, and in spite of our increasing knowledge about the effects of prenatal alcohol exposure, children continue to be born exposed to high amounts of alcohol.
- Fetal Alcohol Syndrome is a devastating developmental disorder that affects children born to women who abuse alcohol during pregnancy.
- Its consequences affect the individual, the family, and society.
- Its costs are tremendous, both personally and financially.
- Effective treatment and prevention strategies must be developed and made available.